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August 10, 1957

VOL. 72, NO. 6 PAGES 81-96

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Eggs for Vaccine

See Page 83

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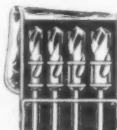
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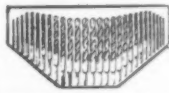
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MEDICINE

Vaccine Crash Program

Drug companies are preparing for the influenza epidemic that will probably sweep the country this fall and winter. Production of vaccine is being intensified.

See Front Cover

► THE PUBLIC Health Service has asked the nation's six producers of flu vaccine to have at least 60 million doses ready by February 1.

An influenza epidemic that will sweep the U. S. from coast to coast is a definite probability and the vaccine is the only preventive measure that exists, Surgeon General Leroy E. Burney of the Public Health Service said.

The drug companies have gone on a crash program with two or three production shifts working seven days a week to get the vaccine ready. They expect to have eight million doses ready by mid-September but half of these have been ordered by the military.

There has already been wide "seeding" of the population with the new Asian strain of the virus and explosive outbreaks this fall and winter will probably occur.

There will not be enough time to produce the vaccine and immunize a majority of the population before the influenza season, but "we want to make the best use of it we can," Dr. Burney said.

With an attack rate of 10%, which is lower than that experienced by some Far Eastern areas, the epidemic's effect on the nation could be considerable, he added.

"We think we will have sufficient time beginning in September to insure that all those who want the vaccine injections will be able to get them," he said.

But other experts admitted there was no way of telling whether the peak of the epidemic would hit in October or not until February or March.

If an epidemic does hit, it could spread from San Francisco to Boston in a period as short as four weeks. There is no effective treatment for the illness and antibiotics are powerless against the flu itself. They are, however, effective in combating the bacterial "hitch hikers" which cause infectious complications.

The Public Health Service will not establish priorities for the available vaccine.

It will, however, strongly recommend that such priorities be set up by the American Medical Association and local, state and territorial organizations.

Immunization priority should go to the three million or so people engaged in health services as well as another nine million people who are in such necessary jobs as communications, transportation, utilities, food processing and distribution, law enforcement and the like.

After that, the very young and the very old, who are more apt to develop complications, should get priority, Dr. Burney said.

Hundreds of thousands of fertile eggs are now being consumed each week by the nation's leading producers of flu vaccine.

They are being injected with live Asiatic-type flu virus and then milked for a vaccine that may be necessary to halt a country-wide epidemic of flu this fall.

Although the exact egg count is a trade secret among the drug companies in the business, one of them, the National Drug Company, Philadelphia, admitted they were using "well in excess of 100,000 eggs every week."

The photograph on the cover of this week's SCIENCE NEWS LETTER shows how, with a special hypodermic syringe, each egg is inoculated with a pre-measured amount of influenza virus. The tops of the eggs are treated with iodine to make them aseptically clean.

The eggs must all be fertile with 10- or 11-day-old chicks inside, and most of them are coming from commercial supply houses that specialize in them.

The cost to the physician will be about one dollar per shot of the polyvalent vaccine, while the monovalent will be a little cheaper, the National Drug Company said.

Polyvalent vaccine protects against several other strains of flu as well as the Asiatic one, while the monovalent type is effective only against Asiatic virus.

Another manufacturer, Merck Sharp & Dohme, Philadelphia, said they would probably not have the vaccine ready until late September. They had intended to produce the polyvalent type but have recently decided to make only the monovalent.

One disadvantage of the polyvalent vaccine, a company spokesman said, is that it requires a greater concentration of each single type of vaccine than is needed for a monovalent vaccine. This happens because each vaccine type becomes more diluted after it is added to others.

Science News Letter, August 10, 1957

PHYSICAL CHEMISTRY

Element 102 Christened Nobelium

► THE WORLD'S newest element, atomic number 102, has been christened nobelium, with No as its chemical symbol. (See SNL, July 20, p. 35).

This designation was made official by the Commission on Nomenclature for Inorganic Chemistry of the International Union of Pure and Applied Chemistry at its recent Paris meeting. The Commission's chairman is Dr. Alexander Silverman, professor emeritus at the University of Pittsburgh.

Two elements were given new symbols, Dr. Silverman also reported.

Einsteinium, a man-made element named after the late Albert Einstein, atomic num-

ber 99, will henceforth have Es as its symbol. Argon, a noble gas of atomic number 18, will have Ar as its symbol. This has been used by other countries with the exception of the United States. The U. S. has used A until now.

Dr. Silverman said in the future new elements will always have a symbol of two letters, consisting either of the first two letters of the name, or the first letter in both the first and second syllables.

Science News Letter, August 10, 1957

GEOPHYSICS

U. S. Plans to Launch "Baby" Earth Satellite

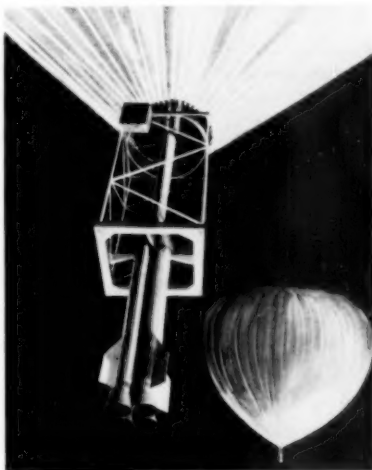
► THE UNITED STATES plans to launch a "baby" earth satellite only 6.4 inches in diameter in November as part of the test program leading to firing fully instrumented 20-inch spheres into space next spring. (See SNL, July 6, p. 10.)

The "test satellite" will weigh about four pounds, compared to the 21.5 of the 20-inch versions. Its only equipment will be a tiny radio transmitter so it can be tracked.

The moonlet will be shot into space by rockets from Cape Canaveral, Fla., from where the larger ones will also be launched. It is not expected to stay in orbit more than about two weeks.

Both the launchings of the "baby" version and the larger satellites are part of the International Geophysical Year.

Science News Letter, August 10, 1957



ROCKET VEHICLE—At the launch altitude for the Far Side rocket vehicle, developed by Aeronutronic Systems, Inc., Los Angeles, the 3,750,000-cubic-foot balloon is fully inflated to its maximum diameter of 200 feet. The full view of the complete assembly shown at the lower right gives an idea of its comparative size. The balloon launching is being made in an effort to free rockets from the big friction of lower atmosphere and to preserve their power for outer space.

SOCIOLOGY

Describe Typical Family

► THE TYPICAL AMERICAN family now plans to have an average of three children.

Only 2.2 children per family are needed to maintain a stable population in the United States.

Prof. Ronald Freedman, a University of Michigan sociologist, has reported that "barring any radical social and economic changes related to family planning, the present population boom will continue for some time to come."

Prof. Freedman based his remarks on a nationwide study conducted by the University of Michigan Survey Research Center in cooperation with the Scripps Foundation for Study of Population Problems.

Interviews for the study were conducted with a scientifically selected, random sample of more than 2,700 married women aged 18 to 39 living with their husbands. This age group includes 94% of the nation's child-bearing women.

He said there was a "very strong consensus" that most families expected to have between two and four children. Three-fourths of those interviewed said they planned to have a family this size. The re-

mainder divided equally between those planning to have fewer than two and those planning to have more than four children.

"Most of those with less than two children are people who cannot have as many as they want for physiological reasons," he said. "Many of those with more than four are people who are having more than they want because of failure to plan successfully or because they do not believe in planning."

"There is now rather general acceptance of the idea of deliberate regulation by each family of the number and spacing of children in relation to its needs and resources. Some groups are opposed to some methods or some motives for family limitation, but all major groups in our population now approve of family limitation under some conditions."

One-fifth of the nation's couples have completed planned families, Prof. Freedman reported.

Another two-thirds have partially planned for their children, while the remaining eighth have "excess fertility," unwanted pregnancies resulting from poor planning or no planning.

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PLANT PHYSIOLOGY

Algae Mass Produced

► ALGAE MUST be kept "content" or they do not multiply rapidly, scientists have found in recent attempts to "mass-produce" the tiny one-celled plants. Just the right balance of carbon-dioxide-enriched air, swirling nutrient solution and temperatures had to be maintained. Algae are microscopic plants that make up the greenish "goo" sometimes seen floating on puddles and ponds.

If they can be grown in large amounts, scientists say, the algae promise to give man a human or animal food which could either be grown cheaply in a small area, or act as a means for storing the sun's energy for future use.

Algae store the sun's energy by a process called photosynthesis. This is a plant's way of converting light energy from the sun and carbon dioxide into plant foods and tissues such as sugar and cotton-like cellulose.

Exploring ways of producing these useful one-celled plants are Dean R. Thacker and Harold Babcock of Charles Pfizer and Co.'s Research Laboratories, Brooklyn, N. Y., who reported their findings to the Association for Applied Solar Energy.

Since the algae in one acre of pond water can yield as much organic material as an acre of grass, cornstalks or some forests, there is no reason, scientists believe, why they cannot be grown, harvested and used much like these familiar sources of food and forage.

But the algae are difficult to "manufacture."

Even under the best conditions, the

scientists obtained only one-third the amount of dry, powdered algae that was possible with their small-scale production methods. Also, the cost of the product is about 50 cents per pound, which cannot compare with the price of wheat, corn or soybeans.

Using smoke-stack gas as a cheap supply of carbon dioxide, and searching for a new, harder type of algae that can grow faster under a wider range of light and temperature are ideas the scientists are working on to help cut the costs of raising the new and unusual "crops."

Until there is some major research "breakthrough," however, they do not think algae could be considered an economical source of food.

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PLANT PHYSIOLOGY

Grow Algae Successfully Outside Natural State

► ALGAE, the single celled, yellow green plants that may hold a solution to the world's future food problems, have been isolated and grown in vitro, two American scientists report.

The algae live inside many different kinds of animals, such as mollusks, sea worms and jelly, fish, which are found in tropical coral reefs and shallow marine waters. Scientists have not been able to make accurate studies of these important little plants because they could not be grown

outside of their "host" animal and in bacteria-free cultures.

Drs. Paul A. Zahl and John J. A. McLaughlin of Haskins Laboratories, New York, report in *Nature* (July 27) that, using a synthetic marine medium, within 15 days they observed a significant increase in the number of algae grown. The 5,000 to 10,000 vegetative cells originally present increased to about 30,000,000. Motile forms of the algae, indicating the presence of flagella or whip-like structures that propel the algae, were also seen after one to four weeks in continuous low light.

The motile cells repeatedly reverted to the vegetative type, the scientists report, and successive transfers are "now routine."

Science News Letter, August 10, 1957

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● RADIO

Sat., August 17, 1957, 1:45-2:00 p.m., EDT. "Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Justin M. Andrews, director, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, Md., will discuss "Research on Allergies."

SURGERY

Device Matches Colors For Artificial Noses

► WHEN ARTIFICIAL ears or noses are prepared for plastic surgery cases, one of the problems is to make them the right color so that they match the face to which they are attached.

A device that does the job quickly and eliminates all trial and error usually necessary is described by Drs. B. Jolles and R. G. Mitchell, General Hospital, Northampton, England, in *The Lancet* (June 29).

Called a hand tintometer, the machine looks like a short fat telescope and contains a graded series of colored glass filters that can be placed together in various combinations. The operator looks through the eyepiece and combines the filters until their color matches that of the area being studied. The particular filter combination is then used as a reference for making the matching color.

The tintometer allows accurate reading of the three attributes of skin color: hue, intensity and saturation. Other methods have allowed only the measurement of the intensity of reflected light, the authors report.

Aside from plastic surgery, the tintometer has proved useful for recording the skin's color changes after radiation. All color matching in one case should be done by the same person, since color perception itself is a personal thing, the authors point out.

The device was developed by Lovibond Tintometer Ltd., Salisbury, England.

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GEOPHYSICS

Scientists Talk From North to South Poles

► TWO UNITED STATES scientists, one near the North Pole and the other in Antarctica, have talked to each other over more than 11,200 miles, the second known direct pole-to-pole conversation in history.

The Columbia University scientists are at their remote stations to conduct research for the International Geophysical Year, an 18-month international study of the planet earth. They reported reception on the "ham" radio band was "clear as a bell."

The two are Dr. Charles R. Bentley of Syracuse, N. Y., who is in the Antarctic, and Maurice J. Davidson of Lynn, Mass., who is in the Arctic.

Reason for the rarity of direct pole-to-pole conversations is that there seldom is activity at both places at the same time.

Science News Letter, August 10, 1957

MEDICINE

Uranium May Kill Cancer

► A URANIUM COMPOUND may be able to kill cancers by making them explode inside with tiny atomic particles. This possibility arises from research reported by Dr. Robert E. Bases from the New York University College of Medicine in *Science* (July 26). Dr. Bases is currently working at the National Institutes of Health, Bethesda, Md.

The new compound is called uranyl protoporphyrin and is made of both uranium and a biological chemical, protoporphyrin, which forms the basis of hemoglobin, the blood's oxygen-carrying substance. Since 1942 the protoporphyrin part of the compound has been known to concentrate in tumors as well as in embryonic and inflammatory tissue.

The theory behind the research is that if a cancerous growth can be made to concentrate uranium inside its borders, it could then be bombarded with neutrons. These neutrons would cause a small chain reaction similar to that taking place inside the atomic fission bomb.

The concentrated uranium would release enormous amounts of energy over very

short ranges and the resulting fission particles might then destroy the cancerous cells and tumor.

So far, attempts to do this have been hampered by the kidney-damaging property of uranium salts, which have proved too toxic for use in humans.

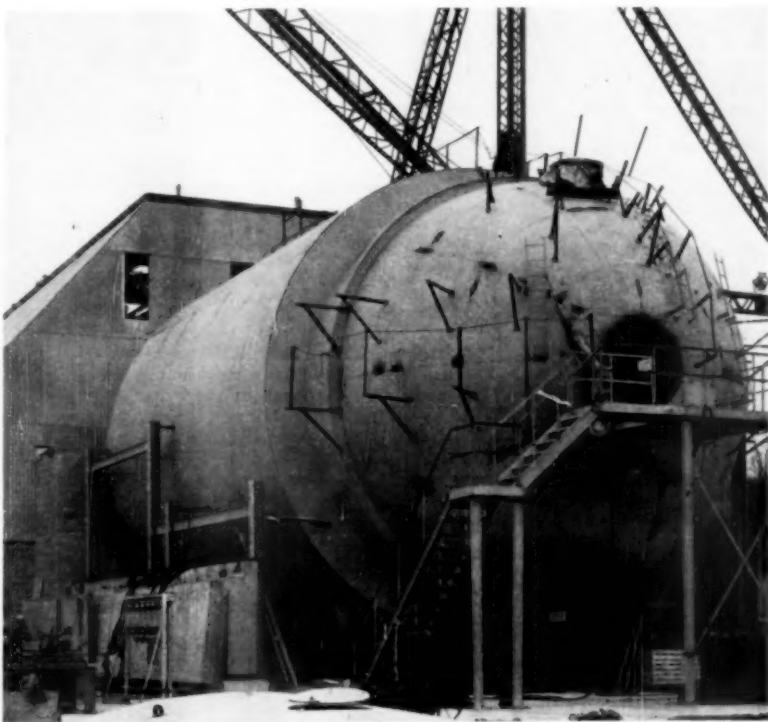
However, the new compound appears to be non-toxic and to have an affinity for cancerous tissue.

A small number of trials on mice have thus far shown the uranium compound to be non-toxic. Animals that received nine times the usually lethal dose of uranium were unharmed as long as the uranium was combined with protoporphyrin.

Further toxicity studies are being made. If they confirm the results of these early ones, a new type of cancer therapy may be possible.

A local or intravenous injection of the uranium compound could be made and then, after allowing time for it to concentrate, the tumor would be treated by bombarding it with neutrons from an atomic reactor.

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TRITON—The submarine hull section shown nearing completion at West Milton, N. Y., will house the prototype of the nuclear propulsion plant for the U. S. Navy's submarine, Triton. Described as the largest underwater craft ever built, it will be powered by two pressurized water reactors and will be the first such plant ever developed for submarine propulsion. Both the prototype and actual nuclear propulsion plant are being designed and developed at the General Electric Company's Knolls Atomic Power Laboratory.

CHEMISTRY

Solid Fuels for Missiles

Guided missiles are being made more dependable. Taxpayers will save money and the armed services will save lives through the switch to solid propellants.

By DAVID PURSGLOVE

► THE FUELS being used to propel America's ever-increasing number of guided missiles are not now reliable enough. They are too dangerous for handling by the soldier, sailor or airman with average military training. And they make the entire missile effort cost more than is necessary.

The Defense Department knows this and is doing something about it.

Nearly all present thinking and some current practice by missilemen is being directed, by order, toward making the rocket and missile program a more reliable defense effort and one that is safer for the men of the armed services as well as for civilians living near missile centers. A by-product will be tremendous money savings for the American taxpayer.

The missile experts are starting by substituting solid propellants for liquid fuels in the biggest part of their program, thus leading to less and less use of liquid oxygen, fuming nitric acid and unpredictable hydrogen peroxide in the future.

Rockets and guided missiles will be powered by such strange fuels as plastics, rubber, nitroglycerine, compounds resembling guncotton and the "exotic" boron compounds.

None of these fuels are entirely new to rocketry. In fact, nobody was surprised when the Defense Department announced in April, 1957, that a study was being made on solid fuels in the light of future fuel requirements of the entire guided missile program. A Defense Department guided missiles official has told SCIENCE SERVICE: "Most of the new smaller rocket missiles now being planned or developed are of the solid fuel type."

Most of these fuels were already being used to some extent in both operational and developmental rockets. They had proved themselves, in general, to be safer, more reliable and less costly to use than the liquids that were then powering most of our missiles.

Advantages of Solid Fuels

These are some of the reasons why solid fuels are slated for an increasingly bigger role in powering rockets and missiles:

1. They are more reliable than liquid fuels. Bringing together just the right amounts of liquid propellant and liquid oxygen, nitric acid or hydrogen peroxide, at just the right time, and igniting them is a tricky business that often fails to result in the successful launching of the rocket. In a solid rocket engine the fuel components are blended at the factory and cast together in the steel or glass fiber shell of the

missile. There is no mixing and adjusting required in the field.

2. The greatest problem facing missilemen—storage of rockets and fuels—is minimized by use of the safe, compact solid engines. Present launching sites of liquid propelled missiles require widely dispersed, heavily shielded bunkers or caves, containing corrosion-resistant pressure tanks for the dangerous liquids, special handling apparatus for fueling prior to launching and more firefighting and rescue equipment on hand. Temperature and humidity must be carefully controlled. After certain periods of time unused fuel of some types must be discarded. Solid fuels, already cast into engine shape, can be handled like ordinary artillery shells. They generally are not subject to temperature and humidity extremes and, if accidentally ignited, merely burn rapidly rather than explode violently. A bullet can be fired through a casing of most solid fuels and the result is most often a ruined casing.

3. Personnel with only average military training can handle solid fuels, while ground crews now handling liquid-fueled missiles must undergo expensive specialized training.

4. In addition to the money saved on misfires, storage and special training, the De-

fense Department anticipates saving money on the actual costs of the fuels themselves. Although some solids cost more than some liquids, most liquid fuels require more money to move a given rocket a specified distance at a desired velocity because of the higher engine and auxiliary equipment costs.

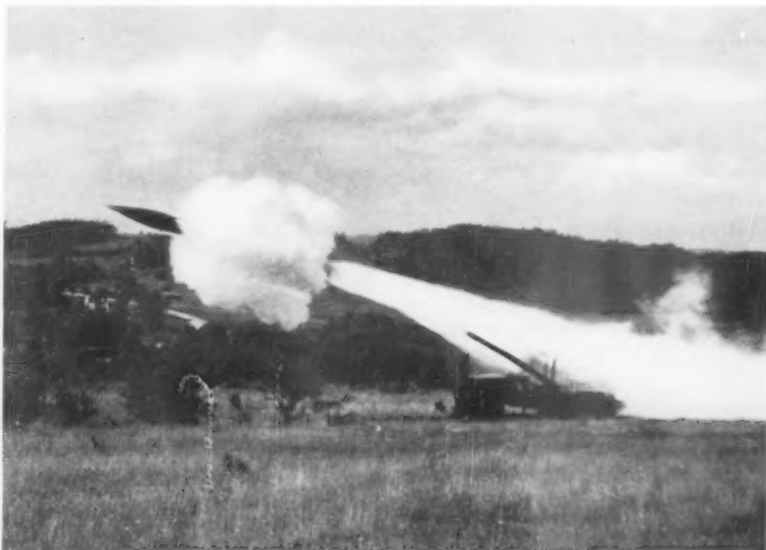
These four reasons would be just a good start on a full list of reasons for the big switch in our rocket and guided missile program. A missileman, especially an engineer, would be quick to point out that solid propellant missiles are not nearly as complicated as their liquid-fueled brothers. In a solid rocket, the fuel tank and combustion chamber are the same. The fuel ingredients are mixed together at the factory and poured into the casing where they solidify, or are molded and machined to shape. This forms the basic rocket to which are added fins, a warhead and, in some cases, a guidance system.

Liquid-fueled missiles require separate storage tanks for each fuel component and pipes or hoses to carry the fuel to the combustion chamber. Accurate valves are also needed for regulating the flow and mixture of the fuel.

Advantages of Liquids

Solid fuels, however, do not have all the advantages.

In liquid propellant rockets the fuel tanks can be very light—just strong enough to support the weight of the fuel. There is no explosion taking place in the storage tanks.



LAUNCH SOLID PROPELLANT ROCKET—An Honest John free-flight artillery rocket is fired at a U. S. Army training area in southern Germany. A solid fuel provides all the energy needed to send this 27-foot-long, 6,000-pound rocket to a target up to 15 miles away. The solid fuel is safer and more dependable than the liquid fuels formerly used in similar weapons.

In the solid rocket, the entire casing must be strong enough and heavy enough to support the propelling explosion reaction. That is one reason the Defense Department believes liquids will continue to propel the long-range missiles.

An enormous quantity of fuel goes into even a 1,500-mile intermediate range missile. A solid steel casing to carry all this fuel and still act as the combustion chamber would be too heavy for use. Casings of glass fiber, however, are somewhat lighter and already have proved themselves stronger than the steel shells.

The flow of liquids can be controlled for slow or fast flight, cut off completely for coasting and then resumed for direction changes. Once a solid is ignited its burning rate cannot be changed.

Liquids generally have a higher impulse ratio. This means that liquids do more work per pound of fuel than do solids. This advantage of the liquids is now being overcome by solid fuel researchers who are rapidly closing the gap between the efficiencies of the two propellants.

Specialized Needs in Fuels

Each of the armed services has its own particular needs in a missile fuel. The Air Force, which will operate large, long-distance missiles from permanent fixed bases, with fuel lines laid and storage bunkers built, is expected to continue using many liquid fuels.

The Army, on the other hand, is becoming increasingly mobile and wants missiles that can be transported easily, with no problems of storage and handling. The Army is expected to power almost all its rockets and missiles by solid fuels. One exception might be the big, long-range Jupiter. It probably will be propelled by a liquid fuel until a more efficient solid is available.

The Navy wants its rockets as small, compact and as easy to handle as possible. Storage space is at a premium on board a ship. A liquid fuel explosion and fire in cramped quarters would be disastrous. The Navy's joint project with the Army on development of the Jupiter was abandoned because of difficulty in using a large liquid missile on board ship. The Navy is proceeding with a new solid propellant missile, called Polaris, to be used instead of the Jupiter.

In addition to calling for solid propellant engines in most new missiles, the armed services are replacing engines on many existing systems. The Nike missiles, already familiar sights around America's major cities, are being modified to be propelled entirely by solid fuels. They had been boosted off the ground by solid fuels and sustained in flight by liquids. The Army liquid-fueled Corporal system is being replaced by the solid propellant Sergeant system.

Over a dozen rockets and missiles in production and being used by tactical forces are powered by solid fuels.

And a solid-fueled rocket will carry the forthcoming earth satellite on the final stage of its powered journey. Stages one and two of the Project Vanguard vehicle will be liquid powered. A solid fuel will power

the third stage to the fringe of the earth's gravitational pull and eject the satellite into its orbit.

High Energy Fuels for the Future

A new prize to be sought by backers of both solid and liquid fuels has entered the scene to influence the battle between these two propellants—high energy fuels. A call has been sounded for fuels capable of releasing far more energy than is possessed by any existing fuel. High energy fuels are going to be needed to propel not only long-range, ultra-fast guided missiles, but also to power globe-circling supersonic bombers already being designed. The Defense Department wants fuels that are as safe as present solid rocket propellants and have greater "oomph" than even the best of our present liquid propellants.

They could be solids, they could be liquids. Current thinking is that the super fuels will be a mixture of both.

Science News Letter, August 10, 1957

WILDLIFE CONSERVATION

States Cooperate In Deer Mortality Study

► THE SERIOUS increase during recent years in the mortality rate of white-tailed deer has brought about what the U. S. Department of the Interior calls "a new type of interstate cooperation on wildlife problems."

Alone or in small groups, the ten southeastern states cooperating could not afford the necessary men or dollars for a study of the causes for such increase. Together, however, the ten states will spend \$20,000 on the project. The University of Georgia will provide the necessary scientific and laboratory services.

The research program will include field work at the scene of outbreaks as they occur, laboratory work and studies with test deer herds. The study will cover deer diseases and nutrition problems, with attention also to toxicity in plants as a possible cause of heavy deer mortality.

Shaler E. Aldous of the Fish and Wildlife Service, Washington, told SCIENCE SERVICE that the problem of high deer mortality in certain areas has existed since the 1800's, but that only recently have efforts been made to study the possible causes. In some countries, Mr. Aldous reports, hunters have found as many as 50 or 100 deer dead as a result of natural causes.

Actually, hunters will indirectly be paying for the research project. The 11% tax on sporting arms and ammunition provided for by the Pittman-Robertson Act for the "restoration of wildlife" goes to state fish and game departments. This money will provide part of the \$2,000 each state is contributing to the deer study. Federal Government matching funds amounting to \$1,500 will be paid to each state so its expenditure is really only \$500.

The ten states participating in the study are Florida, Georgia, Alabama, Mississippi, Louisiana, Arkansas, Tennessee, South Carolina, Virginia and Maryland.

Science News Letter, August 10, 1957

TECHNOLOGY

X-17 Rocket Tests Nose Cones for Missiles

► THE FIRST official announcement that nose cones can return from hundreds of miles above the earth's surface without burning up from intense air friction and resultant heating came simultaneously with the first public showing of the huge Lockheed X-17 at the Air Force Association's convention in Washington, held in connection with the Air Force's 50th anniversary.

The Air Force said that the X-17 research rocket has successfully been used to test nose cones for intercontinental ballistic missiles re-entering the earth's atmosphere from the ionosphere.

Techniques and materials used in the nose cone design and construction are secret. However, details of how the X-17 blasts the various nose cone shapes into space and then brings them smashing down through the earth's heavy layer of air in a severe test of survival were reported.

The X-17 is a three-stage rocket, using only solid propellants. The 40-foot-tall projectile weighs six tons.

After blast-off, it coasts upward to the ionosphere, then drops earthward tail first. As it reaches heavier air, the rocket's nose turns downward. At this point the first stage is ejected and the second fired. A few seconds later, that is ejected and the third stage fired.

During the X-17's flight, which takes little more than six minutes, information on velocity, acceleration, heat and other performance details are continually broadcast to ground stations.

Science News Letter, August 10, 1957

ASTROPHYSICS

"Magic Carpet" Foreseen as True

► THE "MAGIC CARPET" of childhood dreams may actually be a reality some day, Dr. Fritz Zwicky, California Institute of Technology astrophysics professor, predicts. He foresees the carpets as made of tiny closed cells filled with hydrogen or helium, the cell walls being so strong and light that the whole carpet would be lighter than air. Dr. Zwicky reports that the successful production of strong, thin, single crystals suggested the idea of a "magic carpet."

The lifting power, he suggests, could be managed by different degrees of elastic compression of its spongy metallic substance. Dr. Zwicky's ideas are outlined in the first issue of *Astronautics*, a new monthly publication of the American Rocket Society.

In the same issue, Dr. Simon Ramo, executive vice-president of Ramo-Wooldridge Corp., Los Angeles, predicts space conquest may soon become a reality. Unmanned space flight, he reports, appears feasible by reducing the payload of the intercontinental ballistic missile.

"It is easier to hit the moon than to hit a militarily useful target several thousand yards from the launch point," Dr. Ramo says.

Science News Letter, August 10, 1957

BIOCHEMISTRY

Amino Acid Injection Cuts Radiation Damage

► **RADIATION DAMAGE** may be reduced by injections of methionine, an amino acid compound sometimes used in high-protein diets for the treatment of liver diseases.

Its beneficial effects in rats after heavy doses of whole body radiation are reported by a group of scientists from the Atomic Energy Establishment, Indian Cancer Research Centre, Parel, Bombay, in *Nature* (July 27).

After X-irradiation damage, the methionine is able to reduce the fall in levels of deoxyribonucleic acid (DNA) that is found in all tissues. DNA is the life substance in the nucleus of all cells that is believed to carry the mechanisms of heredity.

DNA levels in tissue in irradiated animals fell as much as 87% when they were untreated. But in methionine-treated animals, the levels dropped only about half.

If the methionine was given before the radiation, it was less effective since it was also destroyed by radiation.

The amino acid compound is known to play a part in two chemical processes which are involved in the production of DNA. Thus, its beneficial effect is probably due to its keeping this production process in order, report M. K. Nerurkar, A. J. Baxi, N. S. Ranadive, M. V. Narurkar and M. B. Sahasrabudhe.

Science News Letter, August 10, 1957

BIOLOGY

Ultrasonic Echoes Used To Detect Early Cancer

► **ULTRASONIC** echoes from the human body can be used to diagnose early cancer, a group of Japanese researchers report in the *Journal of the Acoustical Society of America* (July).

The echoes are produced by pulsating ultrasonic waves which are beamed into the body and then bounced back from various internal structures. The technique is similar to radar detection, where reflected radar waves are used to outline an object in the dark.

Different types of tissues give different echoes, which are recorded as wavy lines on the face of a cathode ray oscilloscope. The strength of the echo indicates the diseased state of the tissue.

Brain tumor tissue was found to dampen more of the ultrasonic waves than normal brain tissue did. Anesthetized tissue also gave a different echo than normal tissue.

The ultrasonic waves used were in the frequency range of from one to ten megacycles. They were able to indicate a brain tumor, gall stones, and abdominal and breast tumors, as well as trace the contractions of the large intestine.

An actual picture of the internal organs was made by a synchronous scanning of the body with an ultrasonic beam which traced a radar-like pattern on the face of the cathode ray tube.

This technique, called ultrasonic-tomography, gives an inside picture that is un-

obtainable by any other means, including X-ray examination, the scientists report.

An ultrasonic examination of epileptic patients showed that in almost half of them, their brains stopped less of the high frequency sound than did normal ones. A difference between the echo patterns of the right and left front portions of the brain was also noted.

Reporting the research are Yoshimitsu Kikuchi, Tohoku University, Sendai; Rokuro Uchida, Japan Radio Company, Ltd., Tokyo; and Drs. Kenji Tanaka and Toshio Wagai, department of surgery, faculty of medicine, Juntendo University, Tokyo, all of Japan.

Science News Letter, August 10, 1957

PALEONTOLOGY

Most Dinosaurs Pictured As Peace-Loving Animals

► A **PEACEFUL** plant-eater is how one scientist describes the majority of awesome-looking dinosaurs.

Dr. David H. Dunkle, of the Smithsonian Institution's division of vertebrate paleontology, reports that contrary to the commonly held picture of the "terrible lizard" the majority of dinosaurs were "probably rather peaceful" and ate plants.

Nor were all dinosaurs huge, double-decker bus sized creatures. They came in all sizes, some no bigger than a chicken. Others weighed as much as 50 tons. Some walked upright, some developed suits of bony armor, and some became flesh-eaters.

One explanation for all the different kinds of dinosaurs is, Dr. Dunkle says, that the plant eaters needed either armor plate, or speed and agility, or the ability to take to the water in order to escape from their meat-eating relatives. Some modern day signs of this great variety is indicated by the fact that two very different animals, birds and crocodiles, are the nearest extant relatives of the dinosaurs.

Altogether the dinosaurs, in all shapes and sizes, reigned supreme on the earth for approximately 130,000,000 years. In comparison, all human history covers little more than 10,000 years—at the most.

The earliest mammal-like creatures date back hardly more than 150,000,000 years.

Dr. Dunkle also points out that the dinosaurs' small brain may not have been the major cause of their extinction. Environmental changes caused by the violent upheaval of mountains, the enlargement and destruction of continents may have been a more important factor than intelligence in bringing about their downfall.

"Life must adapt itself to the consequent variations in climate, food supply, and other environmental conditions," says Dr. Dunkle. "When it cannot, that life vanishes. Such, scientists suppose, was the fate of the dinosaurs."

Dr. Dunkle tells the dinosaurs' story in a booklet published by the Smithsonian Institution. Entitled "The World of the Dinosaurs," the new booklet's descriptions are based partly on the fossil material in the National Museum collection, one of the best in the world.

Science News Letter, August 10, 1957

IN SCIENCE

TECHNOLOGY

Jet Flame-Outs Stopped By Platinum Catalysts

► A **PLATINUM ALLOY** rod no larger than a pencil stub can prevent hazardous jet-engine "flame-outs" that cause loss of power or even damaging explosions in the engine from becoming serious.

Jets operate like blowtorches, and can be stopped if the flaming "torch" is obstructed for even an instant by air turbulence, water or ice entering the air intake or concussions from firing guns in flight.

The platinum alloy rod, called "Instalite" by its developers, Charles Engelhard, Inc., East Newark, N. J., acts as a catalyst to re-ignite the unburned fuel gases in the stopped engine. A catalyst speeds up or slows down chemical reactions without being affected itself.

The Instalite rod speeds up the reaction of the fuel gases with incoming air. Inserted permanently in the jet engine's exhaust, the rod is always at white heat while the engine is running. Thus, when a "flame-out" occurs, the fuel gases are automatically re-ignited almost without the pilot's knowing there has been engine trouble.

The alloy requires no maintenance since it does not deteriorate at the high jet engine temperatures, and is not "poisoned," or made ineffective by chemicals in jet fuel, the company reported.

Science News Letter, August 10, 1957

OPTICS

"DVA" Tests Ability To Read Highway Signs

► **CHECK** your "dynamic visual acuity"—DVA for short—if you are having trouble reading automobile highway signs.

Dynamic visual acuity refers to visual relationships in a moving situation, such as driving a car.

It is the subject of research by Slade Hulbert, Albert Berg, John Mathewson and Henry Knoll, consultant, of the Institute of Transportation and Traffic Engineering at the University of California at Los Angeles.

Suspecting that standard eye tests, which involve static charts, do not reveal all the visual factors of a moving situation, the UCLA group has devised a DVA test. Test targets are projected from a revolving slide onto a curved "Cinerama-type" screen. Subjects are asked to describe various details of the patterns as they appeared moving across the screen.

Scores on the DVA test and on a standard eye chart test were checked against the subject's ability to read highway signs in a movie filmed from a moving car. There was a higher correlation between sign-reading ability and good DVA scores than between static test scores and sign reading.

Science News Letter, August 10, 1957

THE FIELDS

ANIMAL PSYCHOLOGY

Sowbug Rated Stupid, But It Does Learn

► A SOWBUG is pretty unintelligent when it comes to learning new behavior in response to new conditions. But it does learn.

The sowbug is the little curled-up crustacean you are likely to find when you turn over a flat rock in the woods. It is an animal without a backbone. Its ability to learn new ways was tested by Dr. Robert Thompson, psychologist of Louisiana State University, Baton Rouge.

It compares very badly with such lower vertebrate forms as newts and turtles, Dr. Thompson finds.

The test was made in a T-shaped plastic box, painted black on the outside. At one end of the cross-bar of the T was the reward which consisted of a little dark box kept moist with a wet sponge. If the sowbug went to the other end of the cross-bar, he received punishment in the form of a mild electric shock. At the point where the dark-loving sowbug had to make its choice of direction, it was urged on by a 150-watt light.

The bug was kept in training until he could turn toward the reward without error seven times in one day. The next day the direction was reversed so that the bug, to get the reward, had to turn in the opposite way. Again it was trained until it was able to go in the right direction seven times without error. Then the direction was reversed again. This was kept up to a total of eight reversals.

The amount of improvement with succeeding reversals was not great enough to indicate that it did not occur by chance.

Perhaps another kind of invertebrate might show up better than the sowbug, Dr. Thompson suggests in *Science* (July 26), but perhaps a backbone is a real help in learning to change.

Science News Letter, August 10, 1957

PHYSIOLOGY

Sex of Human Abortions Shown by Cell Studies

► THE SEX of human abortions can be determined by examining cells from the developing placenta, Drs. A. C. Stevenson and R. H. McClarin, The Queen's University of Belfast, Ireland, report in *Nature* (July 27).

The new technique will help answer the difficult question of whether more male or more female embryos are aborted, and at what times during the early weeks of pregnancy this is likely to happen.

The question of sex ratio in man is of more than academic interest because of present-day radiation concern, the scientists report.

Some lethal mutations from radiation exposure are sex-linked in experimental ani-

mals, and before their effects on humans can be determined, man's sex ratio in conceptions must be known.

The cell "sexing" method is an extension of the one currently used for determining the true sex of individuals born with the physical signs of both sexes. In these cases, cell scrapings are taken and examined under a microscope to determine the infant's correct sex, and what hormonal or surgical treatment may be necessary.

The majority of cells from female individuals show a characteristic mass on the nucleus of the cell, called "sex chromatin," that is absent in male cells. A number of cells must be examined, however, because each female cell does not show the special nucleus.

For determining the sex of embryos after abortion, cells are scraped from the lining of the uterus and checked for the special nucleus. These cells can remain alive for as long as three weeks after the abortion has taken place.

The cells of about 130 abortions have been identified as to sex. By the end of the year it is hoped that enough will have been studied to help determine the male-female ratio in abortion cases.

Science News Letter, August 10, 1957

PUBLIC SAFETY

Tranquilizers Not Shown Dangerous to Driving

► ALL PEOPLE taking tranquilizers should not be considered dangerous while driving a car, Dr. Robert Felix, director of the National Institute of Mental Health, Bethesda, Md., told *SCIENCE SERVICE*.

There is too little known about the drugs' effects on driving ability to make such a sweeping statement at the present time, he said.

However, he did advise individuals taking the drugs to consult their physicians as to driving.

From an office interview, the general physician can get a pretty good idea about the effects of the drug on alertness, coordination and caution, Dr. Felix explained.

Tranquilizers may have the same relationship to driving as alcohol. Although one drink can make a measurable difference in reaction time and coordination, this has not been considered enough evidence to prohibit driving.

Many tranquilizers sometimes make people drowsy. This possible effect should be carefully watched when driving, Dr. Jonathan Cole, chief of the Institute's psychopharmacology center, said.

But there are still too few known facts about tranquilizers and driving to draw any definite conclusions.

No specific research on drivers is now going on at the Institute although various grants for outside research in that area are being considered.

Preliminary work on the drugs and their effects on some types of physical and mental performance has shown that tranquilizers probably make better drivers out of some people and worse ones out of others, Dr. Cole added.

Science News Letter, August 10, 1957

AERONAUTICS

Slots in Airplane Wing Increase Plane's Range

► A WAY to reduce drag or aerodynamic friction will lead to longer-range airplanes that can carry heavier loads, the Air Force's Air Research and Development Command, Baltimore, Md., has announced.

Even the most streamlined airplane surfaces have spots where the smooth airflow "breaks," causing turbulence or drag that actually holds back the airplane.

ARDC researchers solved the problem directly by "catching" the airflow in slots or ducts placed in front of the drag areas, and conducting the air through the wing around the "trouble spots."

In wind-tunnel experiments and flight tests of a modified F-94 airplane, friction drag was reduced to as much as one-seventh its normal value, using this method.

The new design concept was evolved after seven years of intensive research in low drag boundary layer control by ARDC's Wright Air Development Center and Northrop Aircraft, Inc. "Boundary-layer control" includes the study and control of the airflow over aerodynamic surfaces.

Besides the duct method of reducing drag, ARDC is also studying methods of increasing the lift of airplane wing surfaces by blowing or sucking air over the leading edge of the wing or over the wing flaps.

The two systems would enable certain kinds of airplanes to take off and land on a short runway, and to fly much farther with heavier loads, ARDC reported.

Science News Letter, August 10, 1957

TECHNOLOGY

Magnetism Amplifies Weak Microwaves

► A DEVICE for amplifying extremely high frequency radio waves called microwaves depends on the material ferrite, Bell Telephone Laboratories, New York, have reported. The wavelengths of microwaves start at about 15 inches and become smaller with higher frequencies.

Ordinary radio waves can be as long as 15 miles.

The tiny experimental amplifier is mechanically simple, consisting of a magnet and coaxial cables that "pump" microwaves into and out of a tiny resonant cavity containing two very small disks of ferrite, a magnetic compound containing iron and other metallic elements in the form of metallic oxides, used for memory storage units in some electronic computers.

The new amplifier, developed by Drs. H. Suhl and M. T. Weiss of the Laboratories, amplifies radio waves by changing extremely high frequency microwaves into more powerful waves of slightly lower frequency.

This property is expected to be a tremendous help in fields dealing with weak signals such as radio astronomy, radar and microwave "relaying" that transmits many telephone conversations and television over radio beams.

Science News Letter, August 10, 1957

PUBLIC SAFETY

Take It Easy!

Hurry is involved in most traffic accidents or near-accidents, regardless of the vehicle's speed. Study of near-accidents shows, however, that only a few have a single cause.

By MARJORIE VAN DE WATER

▶ IT IS ESTIMATED that by the year 1975, highway accidents will take an annual toll of 51,000 lives.

Not speed alone, but being "in a hurry" may be an important factor in causing accidents. The hurried driver may hold his speed down to the legal limit or a speed suited to conditions, and yet may show his hurry by being impatient to pass or unwilling to wait for the green light. This is indicated by a study of what was behind some 179 near-accidents. The study was made by a committee of the Highway Research Board, under the direction of Dr. T. W. Forbes of the American Institute for Research, Pittsburgh, Pa.

It was undertaken because it is so often difficult to obtain complete information from actual accidents because those involved fear legal complications.

A striking finding of the study was that only in two of the 179 near-accidents was a single factor held responsible. In most of the near-accidents from two to seven factors were mentioned as important.

One of the most important factors accounting for many near-accidents is hurry. A driver may act as though he were in a hurry, regardless of the speed of his car. One or more of the drivers involved were reported as "in a hurry" in 134 out of 179 near-accidents involving 358 drivers.

The remedy for this—a remedy which might reduce the toll of highway accidents materially—would seem to be to follow the advice of the Chinese philosopher and start earlier.

Faulty Driving Behavior

Being in a hurry joins forces with other kinds of faulty driving behavior to bring about an accident.

One kind of behavior linked most frequently with hurry is the kind of driving classed by the committee as "pushing through."

The driver who pushes through is the driver who starts before the signal has quite turned green. Another is the driver who weaves from one lane to another in heavy traffic in an attempt to pass slow-moving cars. Another is the driver who cannot wait to pass the car stopped or slowed for a turn but who shoots ahead and passes on the wrong side. The driver who passes when an oncoming car is too close or the one who follows another car closely, impatient to pass, is guilty of "pushing through."

The driver who shows such accident-provoking behavior, as well as the one who is impatient to cross a main highway and

squeezes through fast-moving traffic coming from opposite directions, is usually in a hurry. Judged "in a hurry" were 43 out of 47 "pushing through" drivers.

Being in a hurry may even affect a driver's perception or judgment of conditions.

The hurried driver is the one likely to misjudge his opportunity to pass (13 out of 14 drivers) or the seriousness of a hazard ahead of him (15 out of 21). Out of a total of 79 drivers concerned in near-accidents involving misjudgment or errors of perception, 52 drivers were also in a hurry and their haste may actually have contributed to their misjudgment.

Speed is not nearly so important in causing near-accidents as many people have supposed. The greatest number of the incidents involved cars going from 50 to 55 miles per hour, but that is probably because more cars cruise at that speed rather than because it is an excessive speed. Only 2 out of 174 reports indicated that a car involved was going "too fast."

Neither did visibility conditions appear to contribute much to near-accidents. A total of 101 out of 162 incidents occurred under conditions of good visibility.

In only 18 cases out of 117 was the road surface reported to be wet, slippery or icy.

In 23 cases out of 74, one of the drivers involved seemed inattentive or "asleep at

the switch," and in another 20, a driver seemed to be asleep, drowsy or intoxicated.

In long cross-country drives, it would be wise to stop about every hour and a half for a 15-minute period of relaxation and to drink a cup of tea. This is indicated by another study conducted, however, not on the road but in a simulated driving situation using a "drivometer."

Tea for the Road

One group of 28 persons "drove" for three hours straight with no pause for rest or refreshment.

Another 25 persons were served tea just before they started on the long "drive" and after an hour and a half of continuous "driving" they received a 15-minute rest period when tea was again served.

Tests of steadiness, reaction time, coordination, blood pressure and galvanic skin response, pulse and respiration were used to measure efficiency and compare the group who had rest and refreshment with those who drove for three hours straight.

The tea and pause combined, it was found, seem to have a quieting effect which is reflected in the tendency to work a little harder, to stay alert and to handle driving problems with greater efficiency.

Drs. A. R. Lauer and Virtus W. Suhr of the Driving Research Laboratory at Iowa State College reported this study to the Highway Research Board.

It is estimated that an obstruction to vision contributed to one out of every eight motor vehicle accidents, Drs. Barry G. King and Peter J. Sutro of the medical



IN A HURRY—The cars shown in this U. S. Bureau of Public Roads photo are approaching, not speeding, but their impatience to pass the slow moving truck and the car leading the string is indicated by the fact that three have wheels across the solid white line. Such impatience often leads to a crash or the fright of a near miss.

division, Office of Aviation Safety of the Civil Aeronautics Administration, reported to the Highway Research Board.

In two-fifths of the cases, vision was interfered with by objects on the car. The dangling baby shoes or fox's tail carried for luck may turn into bad luck if they keep a driver from seeing an obstacle in the road ahead or a car approaching rapidly on a side road.

Visibility and Safe Driving

In rain or snow, windshield wiper design controls to a large extent the limits of what can be seen. Only a small portion of the transparent area is cleared by the windshield wiper; it may be less than 30% of the total transparent area. And even the area cleared by the wipers may nevertheless be seen through only dimly because of fogging.

The hood and the roof also put a limit on visibility. Insect shields or radiator ornaments may cut down visibility even more.

It is wise to limit windshield stickers to inspection or other stickers required by law and to place these where they will obstruct vision the least.

The driver's stature may limit his view of the road ahead.

The short driver who has no cushion on which to sit may be annoyed by having to play peek-a-boo through the steering wheel to get a view of the road ahead. In addition to this inconvenience which may give him (or her) a kink in the neck, a serious hazard exists. A car on the road ahead may be completely hidden by the upper part of the steering wheel.

In about a third of the cases where faulty vision caused accidents, it was a stationary object such as a tree or a building that interfered with seeing. In a few cases the interference was in the form of glare.

To these cases of obstructed vision must be added an undetermined number where the dangerous object failed to register in the driver's consciousness because of his inattention, distraction or other causes.

Distraction Is Good and Bad

Distraction is a hazard to the driver.

Accidents have been caused when the driver momentarily turned his head to look at or speak to a passenger. A baby's sudden desire to plant a kiss on Daddy's cheek may cause the car to go into the ditch. Incidentally, the front seat beside the driver is the most dangerous place in the car for a young child. This is not only because of the danger of distracting the driver but also because, should a crash occur, a child is most likely to be seriously injured in this place.

Distraction, however, is not necessarily always prejudicial to safety. An occasional glance in the rear vision mirror or at the distant horizon may prevent a too great preoccupation with the highway. Preoccupation with the road may have a kind of hypnotic effect on the driver on a long trip, especially at night or on a monotonous, straight stretch of highway.

An attempt has been made by Dr. Leon Brody, director of research at the Center for

Safety Education, New York University, to find significant differences in the personal characteristics of chronic law violators and accident repeaters and those of a control group of drivers with good driving records.

He tested simple reaction time, but no significant difference was found.

On complex reaction time, no significant difference was found between the good drivers and the chronic violators.

On glare recovery time, mixed results were obtained.

On depth perception, no significant difference was found.

On field of vision, the good drivers were better than chronic violators in one or the other eye, but they did not differ from accident repeaters.

Visual acuity was one characteristic in which a significant difference was found. Chronic violators have significantly better vision than the good drivers!

Personality and Good Driving

Other research studies have shown, however, that chronic violators are likely to be aggressive and intolerant of others. They tend to resent authority. They are inclined to have an exaggerated opinion of their importance and their abilities. And they are likely to be lacking in responsibility and tend to act impulsively and suddenly.

Any sudden action—changing lanes, pulling out from the curb, turning without previous signal, stopping, backing, passing or even starting up from a stop light—may put the driver and others on the road in serious danger.

Science News Letter, August 10, 1957

MEDICINE

One Million a Day Hospitalized Last Year

► MORE THAN a million people were in the nation's hospitals every day last year, and there will probably be even more this year, according to the annual report on hospital statistics published in *Hospital*, journal of the American Medical Association.

The data were gathered from 6,966 hospitals listed by the Association's annual directory and showed continuously increasing costs to both hospital and patient.

There were 22,089,719 hospital admissions last year, nearly a five percent rise from 1955. About 15,000,000 of these were in voluntary nonprofit hospitals.

Of all the admissions, less than two percent were to psychiatric hospitals in 1956, although over half of all patients in hospitals on any given day were in psychiatric institutions.

The number of babies born in hospitals rose only slightly from 1955 and totaled almost 3,500,000.

Hospitals had to pay out more than \$6,000,000,000 to care for their patients, an increase of 207% since 1946 and nearly an eight percent jump from 1955 expenditures.

Each patient cost the nonprofit short-term hospitals \$24.99 per day in 1956 and payroll expenses of these hospitals amounted to almost \$2,000,000,000.

Science News Letter, August 10, 1957

ORNITHOLOGY

Climate Does Not Keep Flamingo From Hatching

► THE FIRST BABY flamingo north of San Antonio, Texas, and Miami, Fla., has been hatched at the Philadelphia Zoological Garden.

The proud parents are American, or Ruddy, flamingos, one of six pairs that laid eggs this year.

The successful hatching may be the result of a little prodding on the part of John A. Griswold, the Zoo's curator of birds. A small island was built in the middle of the flamingos' pool and on it he fashioned three sample nests—just to give the birds some idea of what was expected. They caught on, but rebuilt the nests and added others.

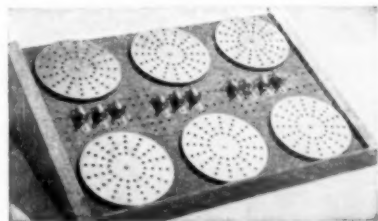
A flamingo nest is a simple affair, a column of dried mud 18 to 20 inches high and a foot across. Normally one egg is laid.

Science News Letter, August 10, 1957

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Books of the Week

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ACOUSTICS—Joseph L. Hunter—Prentice-Hall, 407 p., illus., \$8.50. For the student who has already covered general physics and calculus, including some partial differentiation.

ATOMIC RADIATION: Theory, Biological Hazards, Safety Measures, Treatment of Injury—RCA Service Company, 110 p., illus., paper, \$1.60. A manual for those working with radiation, indicating their responsibilities in avoiding injury.

AUTHORIZING LEGISLATION: Hearings Before the Subcommittee on Legislation of the Joint Committee on Atomic Energy, Congress of the United States—Carl T. Durham, Chairman—Govt. Printing Office, 654 p., paper, \$1.75. Hearings on the AEC's fiscal year 1958 reactor construction budget.

BIBLIOGRAPHY AND INDEX OF GEOLOGY EXCLUSIVE OF NORTH AMERICA: Volume 20—Marie Siegrist, Mary C. Grier and others—Geological Society of America, 768 p., \$8.00. An alphabetical author list is followed by a subject index to the papers cited. If a paper has titles in more than one language, all titles are usually given.

THE BIRDS OF ISLA COIBA, PANAMA—Alexander Wetmore—Smithsonian, 105 p., illus., paper, \$1.30. Listing 133 species and subspecies of birds from an island, the largest on the Pacific coast of Central America, covered with heavy virgin forest except along the lower courses of the larger streams where there are swampy woodlands.

THE CALIFORNIAN WILDLIFE REGION—Vinson

Brown—Naturegraph Co., rev. ed., 128 p., illus., paper \$2.00, cloth \$2.75. Telling about the animals and plants in relation to where they like to live. To help nature lovers identify what they see.

CHARTING STEEL'S PROGRESS: A Graphic Facts Book on the Iron and Steel Industry—American Iron and Steel Institute, 68 p., illus., paper, 50 cents. Presenting statistics of the industry in the form of graphs and charts.

CHEMISORPTION: Proceedings of a Symposium Held at the University College of North Staffordshire, Keele, Staffordshire—W. E. Garner, Ed.—Academic, 277 p., graphs, \$9.00. This symposium may be regarded as a continuation of those on "The Adsorption of Gases" at Oxford in 1932 and on "Heterogeneous Catalysis" in 1950.

THE CHEMISTRY OF ORGANOMETALLIC COMPOUNDS—Eugene G. Rochow, Dallas T. Hurd and Richard N. Lewis—Wiley, 344 p., diagrams, \$8.50. A brief and readable review of the subject useful to the student and also the more general reader with, however, a background of chemistry.

A CONFERENCE ON ATOMIC ENERGY IN NEW YORK STATE—Industrial Liaison Office, University of Buffalo, 57 p., paper, 10 cents. Record of the conference sponsored by the Governor's Council on the Use of Nuclear Materials, the University of Buffalo and the Buffalo Chamber of Commerce.

DOCTOR COURAGEOUS: The Story of Dr. Gantly Dick Read—A. Noyes Thomas—Harper, 218 p., illus., \$3.75. A biography of a pioneer in "natural childbirth."

EXCITED STATES IN CHEMISTRY AND BIOLOGY—C. Reid—Academic, 215 p., illus., \$7.50. Outlining some of the more important physical concepts concerning molecular excitation and interaction and applying them to a few chemical and biochemical situations.

FLAMMABLE LIQUID TRADE NAME INDEX, MAY 1957—National Fire Protection Association, rev. ed., 120 p., paper, \$1.50. Listing the flash points of 3,600 products and identifying each as to its principal uses, manufacturer and the source of information.

FREE AND INEXPENSIVE LEARNING MATERIALS—Division of Surveys and Field Services, George Peabody College for Teachers, 8th ed., 264 p., illus., \$1.00. This list contains some 4,255 items, none of which costs more than 50 cents.

GUIDED WEAPONS—Eric Burgess—Macmillan, 255 p., illus., \$5.00. Intended to introduce the reader to the fundamentals, both historical and technical, on which guided weapons are based.

AN ILLUSTRATED GUIDE TO FOSSIL COLLECTING—Richard Casanova, edited by Vinson Brown—Naturegraph Co., 80 p., illus., paper, \$1.50. To help "rock hounds" recognize what they have found.

HANDBOOK ON MULCHES—Paul Frese, Guest Editor—Brooklyn Botanic Garden, Plants & Gardens, Vol. 13, No. 1, 79 p., illus., paper, \$1.00. Leading horticultural experts contribute to this booklet for the home gardener.

INTRODUCTION TO PSYCHOLOGY—Ernest R. Hilgard—Harcourt, Brace, 2d ed., 653 p., illus., \$6.50. Text for an introductory college course. One feature of this text is a discussion of unsettled problems inserted here and there to encourage students to do their own thinking and to realize that psychology is "an unfinished science."

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ISOTOPIC TRACERS IN BIOLOGY: An Introduction to Tracer Methodology—Martin D. Kamen—*Academic*, Volume 1 of Organic and Biological Chemistry, 3d ed., 474 p., illus., \$9.50. Since publication of the first edition, use of tracers in biological laboratories has become commonplace. Stable isotopes are now included and the chapters on nuclear physics and chemistry have been rewritten.

PURDUE RESEARCH FOUNDATION ANNUAL RESEARCH REPORT 1956—Frederick L. Hovde, president—*Purdue Research Foundation*, 32 p., paper, free upon request direct to publisher, Lafayette, Ind. Containing the annual report and a bibliography of publications of the Foundation staff.

SCIENTIFIC AND TECHNICAL TRANSLATING AND OTHER ASPECTS OF THE LANGUAGE PROBLEM—J. E. Holmstrom—*UNESCO (UNESCO Publications)*, 282 p., diagrams, paper, \$4.00. This discussion covers not only the problems of translators but that of scientists in learning languages other than their own and the need for publication in commonly read languages. There is a special discussion of auxiliary languages, including Interlingua.

SPELEO DIGEST 1956—John R. Dunn, William B. White, and H. Russell Howard, Eds.—*Pittsburgh Grotto Press*, (National Speleological Society), illus., paper, \$2.00. A compilation of the most interesting articles from the newsletters of chapters of the National Speleological Society—news of new caves and new data on old caves and activities of spelunkers.

SPHEROIDAL WAVE FUNCTIONS—Carson Flammer—*Stanford University Press*, Stanford Research Institute Monograph, 220 p., \$8.50. Intended to facilitate the use and calculation of spheroidal wave functions by the presentation of a detailed and unified account of the properties of these functions.

STATISTICAL SUMMARY OF EDUCATION 1953-54—Rose Marie Smith and W. Vance Grant—*Goet, Printing Office*, Office of Education, Biennial Survey of Education, Chapter 1, 86 p., paper, 35 cents.

THE THIRPS OF CALIFORNIA: Part 1, Suborder Terebrantia—Stanley F. Bailey—*University of California Press*, Bulletin of the California Insect Survey, Volume 4, No. 5, 78 p., illus., paper, \$1.50. Contains suggestions for collecting this tiny insect seldom collected by the average entomologist although well-known to the home gardener.

Science News Letter, August 10, 1957

GENERAL SCIENCE

Government Studies Money for Research

► THE INCREASING awareness of the importance of basic scientific research has been reflected in the increasing amount of dollars spent on it in the United States, the National Science Foundation has reported.

In a study based on the total funds expended for basic research in the physical and life sciences for 1953, the most recent period for which figures are available, the Foundation found the expenditures are "one index of the nation's scientific progress."

In 1953 a total of \$435,000,000 was spent for basic research in the natural sciences. This figure, the Foundation noted was 8% of the estimated total of \$5.4 billion for research and development or about 0.1% of the gross national product of \$363 billion.

The study also showed the following:

1. Colleges and universities performed a good share of the basic research accounting for \$205,000,000 or 47% of the total. Indus-

try followed with 39%; the Federal Government, 11%; and private foundations, health agencies and academies of science, 3%.

2. Industry and the Federal Government paid most of the basic research bill, providing \$179,000,000 (41%) and \$158,000,000 (36%) respectively.

3. Of the total amount spent in 1953, 70% went for basic research in the physical sciences.

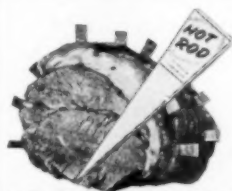
The Foundation defined research as "basic only if its primary aim was 'fuller knowledge' rather than 'a practical application'."

Science News Letter, August 10, 1957

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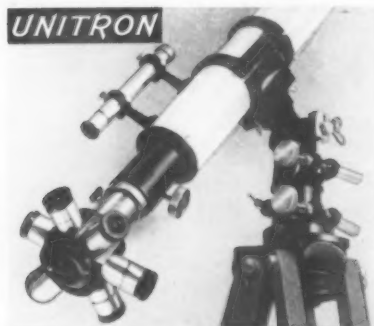
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BIOCHEMISTRY

Study Morphine Effects

► IN AN EFFORT to trace morphine from its beginning in a plant through the human body, scientists at the University of California at Los Angeles are trying to grow "hot" poppies.

Dr. Edward Leete, assistant professor of chemistry, is investigating the origin of morphine by feeding radioactively tagged compounds to the opium poppy.

If the poppy uses one or more of the radioactive compounds in the synthesis of morphine, a main component of opium, the drug then will become radioactive.

Thus the radioactivity will help detail the manner in which morphine is formed and perhaps give a clue to its function in the plant, which is unknown.

Radioactive morphine, which Dr. Leete hopes to make available, would be a valuable tool to medical science. By using the "hot" dope, medical scientists could follow its course through the body.

In this manner they could learn more about the drug's beneficial effects in relieving pain or the harmful path that leads to drug addiction.

► THE EFFECT of morphine can be partly overcome by two of the tranquilizing drugs, it is reported in *Nature* (June 15).

Drs. F. M. Sturtevant and Victor A. Drill of the division of biological research of G. D. Searle and Co., Chicago, Ill., report that since morphine has a very peculiar effect on cats, it was possible to test the effect of tranquilizers on the morphine reaction.

Injection of morphine produces mania in the cats, making them highly excitable, apprehensive and lacking in muscular coordination. The eye pupils of the cats were markedly dilated.

When either chlorpromazine or reserpine was given with the morphine, the severity of the morphine excitement was lessened.

The effect of the morphine in dilating the pupils predominated over the contracting effect of the tranquilizers, except when reserpine was given several hours after morphine.

The morphine did not affect the tendency of the tranquilizers to relax the inner eyelid of the cats.

Science News Letter, August 10, 1957

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ASTRONOMY

Rediscover Faint Comet On Return Trip

► A VERY FAINT comet named Encke has been spotted on its return trip to the sun's vicinity.

The most noteworthy fact about Comet Encke is the very short period of three and a third years in which it completes one revolution around the sun. The object, rediscovered by Dr. H. M. Jeffers of Lick Observatory, Mt. Hamilton, Calif., has a magnitude of 17, so is visible only with the very largest telescopes.

News of its recovery was bulletined to observatories in the Western Hemisphere by Harvard College Observatory, Cambridge, Mass.

Science News Letter, August 10, 1957

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MISCELLANEOUS

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Do You Know?

The *sulfonamides*, penicillin and broad-spectrum antibiotics have helped bring about a spectacular decline in the pneumonia death rate.

During the first year's use of a baby atom smasher for treating deep-seated cancer, in two-thirds (48) of 74 patients treated, all traces of tumor disappeared.

Research and experimentation are proposed to develop methods for the commercial production of fish on flooded rice acreage in rotation with field rice crops.

A teaspoonful of diesel fuel oil in a locomotive will carry a ton of freight one mile.

PUBLIC HEALTH

Cost of Workers' Illness Takes 13% of His Income

► **PROLONGED SICKNESS** costs the worker in private industry an average of 13% of his income each year, a five-year study of non-occupational illness conducted by the Research Council for Economic Security of Chicago indicates.

The average wage of the employees covered by the study was \$3,485 a year. Lost wages cost the average worker \$323 and in addition to this he spent \$129 in medical costs.

Medical costs are higher for men than for women although women have more prolonged illness absences than men, it was found.

Benefits from group insurance plans do not cover the costs of illness to the worker, it was discovered. Almost 71% of the benefits go for hospitalization and a little over 24% for surgical care. This leaves only five percent of the benefits for physicians' fees, nursing services and all the other costs of prolonged sickness. Hospitalization benefits cover 80% of hospital charges and 61% of surgeons' fees, but they cover only 16% of all the other charges.

For the average absentee due to prolonged illness, the net cost, after payment of group plan benefits for medical care, sickness compensation and sick leave, was equal to 13% of his normal earnings.

This was paid for by 41% out of savings intended for purchase of a house, a car, or some major household appliance such as a refrigerator or washing machine. About 19% arranged to pay for their sickness in installments and 16% borrowed to pay their debts.

In addition to this cost to the worker, there was a loss to production of the equivalent of the work of 453,000 men for a full year for the 52,400,000 non-farm workers.

Altogether the loss to employee and employer and to the nation runs into the billions.

Science News Letter, August 10, 1957

Questions

BIOCHEMISTRY—What information do scientists hope to gain from their study of radioactive poppies? see p. 94.

BIOLOGY—How can ultrasonics be used to detect cancer? see p. 88.

GEOPHYSICS—What equipment will the "baby" earth satellite carry? see p. 83.

MEDICINE—What biological chemical has been combined with uranium to form a possible cancer-killing compound? see p. 85.

PALEONTOLOGY—How important was the dinosaur's small brain in contributing to its extinction? see p. 88.

Photographs: Cover, Merck Sharp & Dohme; p. 83, Aeronautic Systems, Inc.; p. 85, General Electric Company; p. 86, U. S. Army; p. 90, Fremont Davis; p. 96, E. I. Du Pont de Nemours.

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☼ **SOLAR CAMERA** is billed as the world's first in which light energy alone supplies the power to generate the electric current that adjusts the lens. The electric eye sets the lens for proper exposure through its full range of stops. The camera is an automatic 8mm movie camera.

Science News Letter, August 10, 1957

☼ **LINT FILTER** can be attached to washing machines without the aid of tools. Made of stainless steel and aluminum, the filter is designed to be slipped over the sud-saver hose. The filter can be used with any sud-saver type automatic washing machine.

Science News Letter, August 10, 1957

☼ **POWER DIVER** permits an underwater enthusiast to skim along at depths up to 100 feet for as long as an hour. It can pull a 200-pound diver at two miles per hour underwater. The 43-inch-long device is powered by either a 6- or 12-volt aircraft-type rechargeable battery. The diver can skim on top of the water or use the device to descend, bank, roll, turn, and ascend.

Science News Letter, August 10, 1957

☼ **EGG BEATER BLADES** molded of a nylon resin are said to beat 50% to 60% faster than conventional egg beaters. The nylon blades, shown in the photograph, can



be safely inserted in boiling mixtures. Besides the blades, the gears and bearings are also made of the nylon resin. No oiling is needed for the beater, which is available in six colors.

Science News Letter, August 10, 1957

☼ **WORKSHOP LIGHT** can be moved from one work area to another by means of a quick-coupler mechanism built into the light's base. A turn of the coupler sleeve

locks the light on a small mounting bracket placed where light is needed. The workshop lamp is available with either 18- or 24-inch arms and two or three cords.

Science News Letter, August 10, 1957

☼ **STARTING DEVICE** for all types and makes of diesel engines is a double-action air pump which enables the operator to prime the engines. Made of aluminum castings, the device can be installed on a vehicle's instrument panel. It is described as starting engines within 15 seconds.

Science News Letter, August 10, 1957

☼ **WORD-BUILDING GAME** is played like dominoes. The game has 48 domino-like pieces, each bearing a prefix and a word ending, no two alike. Words are built by combining an ending and a prefix. More than 1,200 words can be constructed. The game can be played by two or more players.

Science News Letter, August 10, 1957

☼ **SWIVEL MAGNIFIER** is designed especially for hobbyists. The four-inch diameter, plus five Diopter, eight-inch focal length magnifier is mounted on a heavy metal frame with a swivel for one-hand operation. It can be mounted on a workbench, swing-away light or over a fly-tying vise.

Science News Letter, August 10, 1957



Nature Ramblings



By HORACE LOFTIN

► **WOODPECKERS** are supposed to stay in trees and on poles. Furthermore, they should typically perch not on the ground but on the steep vertical side of a tree trunk. Then, too, you expect them to feed by pecking insects out of the wood with their wonderfully adapted bill.

Now the flicker has all of the standard equipment of a good woodpecker: massive, sharp bill; hard, pointed tongue; stiff, elongated tail feathers to support him in the vertical position; and toes placed two in front, two in back for clinging to bark.

But the flicker is a most disturbing woodpecker. He is a non-conformist. You may see him on the side of a dead tree, busy hammering for insects. On the other hand, you are quite as apt to see him standing flat-footed on the ground eating berries.

Ants seem to be the flicker's caviar, and most of his activity on the ground is in

The Non-Conforming Flicker



pursuit of these delectable insects. He has found his hammer-like woodpecker's bill serves quite adequately as a pick for digging into ant nests. When insects are hard to find, he takes his fill of berries.

The common flicker, *Colaptes auratus*, is easy to recognize on the wing by his deeply undulating flight and flashing white rump. Also, the flicker is the only brown-backed woodpecker.

The first sight of a flicker on the ground, however, is liable to send you hurriedly thumbing through your field guide. He just does not look like a woodpecker as he stalks along under a bush. The give-away is a broad black band which cuts across his breast. This identifies him immediately.

From the limit of trees in Alaska and Canada southward to the Gulf of Mexico and from the East Coast to the Rockies, the common flicker is an abundant bird. He is perhaps the most familiar woodpecker to Americans and has acquired some 123 popular names over the country. Next to flicker, he is best known as the golden-winged woodpecker or the yellow hammer.

The flicker is a large bird, about 12 inches in length and with a wingspread of some 18 to 21 inches. An average of five to nine eggs are laid in the nest, which is usually excavated in a tree, the hole as deep as 24 inches.

Science News Letter, August 10, 1957